REMARKS

Claims 1-8, 11-14 and 17-25 are pending in the application. Claims 9, 10, 16 and 17 have been canceled. Claims 26-48 have been withdrawn from consideration. Claims 1, 13, 11 and 18 have been amended. No new matter has been added. Support for all amendments can be found in the specification as originally filed.

OBJECTIONS TO THE SPECIFICATION

The abstract of the disclosure was objected to for containing more than 150 words. The abstract of the disclosure has been corrected and now contains less than 150 words. Reconsideration is requested.

CLAIM OBJECTIONS

Claims 11, and 18 have been updated with the change from "the area of reduces sensitivity" to "the area of reduced sensitivity". However, the phrase "the area of reduced sensitivity" was not mentioned in claims 12 and 19, therefore no changes were required. Reconsideration is requested.

REJECTIONS UNDER 35 USC 103

1) Claims 1, 6-9, 13-16, 24 and 25 stand rejected under 35 USC 103(a) as being unpatentable over Carr in view of Hirschman. This rejection should be withdrawn in view of the amendments made hereinabove.

Claim 1 is directed to a sensor device and has been amended to include subject matter similar to that of canceled claims 9 and 10. Claim 1 includes that

"each of the plurality of antenna elements comprises at least a first antenna element pair and a second antenna element pair, the first antenna element pair comprising a first transmitting antenna element and a first receiving antenna element, the second antenna element pair comprising a second transmitting antenna element and a second receiving antenna element" and that "the sensor device wherein the first antenna element pair and the second antenna element pair are spaced from each other to create an area of reduced sensitivity between the first antenna element pair and the second antenna element pair" Further, Claim 13 also includes an amendment of similar subject matter and as found in canceled claims 16 and 17. Support for these amendments is found in the specification and claims as filed. No new matter has been added. Neither, Carr nor Hirshman, either alone or in combination teach or suggest Applicants' invention of Claims 1 and 13. Further, the other cited art does not remedy these or any other deficiencies (see arguments below for section 3 related to Culver). Thus, Claims 1 and 13 are believed to be allowable.

Regarding Claims 6-8, 13-16, 24 and 25, Claims 6-8, 13-16, 24 and 25 depend from claims 1 and 13, either directly or indirectly. As discuss, Claim 1 and 13 are believed to be allowable, thus claims 6-8, 13-16, 24 and 25 are also believed to be allowable. Reconsideration of Claims 2-5 and 20-23 is requested.

2) Claims 2-5 and 20-23 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Carr et al. in view of Hirschman, as applied to claims 1 and 13 above, and further in view of Cudahy et al. This rejection should be withdrawn in view of the amendments made hereinabove.

Regarding Claims 2-5 and 20-23 depend from claims 1 and 13, either directly or indirectly. As discuss, Claim 1 and 13 are believed to be allowable, thus claims 2-5 and 20-23 are also believed to be allowable. Further, Cudahy does not remedy any of the deficiencies of Carr and Hirschman. Thus, Reconsideration of Claims 2-5 and 20-23 is requested.

3) Claims 10-12 and 17-19 stand rejected under 35 U.S.C.(a) as being unpatentable over Carr et al., in view of Hirschman as applied to claims 9 and 13 above, and further in view of Culver et al. This rejection should be withdrawn in view of the amendments made hereinabove.

Claim 10 and 17 have been canceled as the similar subject matter has been added to Claims 1 and 13 respectively.

The Office Action correctly states with regard to claims 10 and 17, Carr et al. disclose antenna elements (col. 3, lines 30-52) and Hirschman discloses the application of RF electrical energy to such elements (col. 7, lines 49-55) but neither Carr et al. nor Hirschman specifically disclose that the element pairs are spaced from each other to create an area of reduced sensitivity between the first antenna element pair and the second antenna element pair. However, the Office Action alleges that Culver et al. teaches a source and detector setup where a gradient of sensitivity defined by boundary contours (col. 7, lines 40-51), and that it would have been obvious to one of ordinary skill in the art at the time of invention to apply the teaching of Culver et al. to Carr et al. and Hirschman, as to provide differential sensitivity of detection for different geometries of tissue.

Culver is directed to extravasation determined by monitoring light transmitted through tissue. Light is radiated from a plurality of light sources in an encoded manner

into the body part at the site at which the fluid is injected and the light that is reflected, scattered, diffused or otherwise emitted from the body part is detected individually by a plurality of light detectors. Signals representative of the detected light are developed and, prior to injection of the fluid, references are developed against which measurements made during injection of the fluid are compared. (see Abstract 4-9).

In particular, Culver in FIG. 7 illustrates schematically the manner in which light source/light detector pairs function to develop signals from which extravasation can be determined. Light source 20 radiates light into body part 16 (e.g. the wrist) at an infusion site. Thus, **sensitivity contours 60 and 62 are in the body**. **Sensitivity contours related to depths of the tissues from the sensors/sources place in any position relative to eac hothe ron the surface of the skin.** The detection of extravasations 64 and 66 will vary based on both the size and the location of the fluid which affects the light transmitted from a light source through the body part to a light detector. For example, the same size objects can result in significantly different signals developed by a light detector because the distances of the objects from the sensitivity contour associated with the light source/light detector pair are significantly different. **Generally, the greater the depths of the object in the body part, the smaller the signals developed by the light detectors.**

Objects located the same distance from the sensitivity contour associated with the light source/light detector pair can result in significantly different signals developed by the light detector because the sizes of the objects are significantly different. The greater the size of the object in the body part, the larger the signals developed by the light source/light detector pairs. By combining the information from light source/light detector pairs with different separations and different locations, the volume of the extravasation object can be determined independent of the depth and the location of the object.

This process and system described in Culver is diffused optical tomography based on the size and location of the fluid in the body and not on the sensors (light detectors 22' 22") and light source 20. **Thus there is no placement of the light sources and light detectors relative to the surface of the skin that will create areas of differentiate sensitivity therebetween.** This is completely different that Applicants' invention and actually teaches away from the Applicants' invention because the sensors and light source can be any variety of distances from each other on the surface on the skin. In other words, the relative different of the light sensors and light source does not have any effect on sensing capability.

The novel difference of Applicants' invention is that the sensor device includes at least a two antenna element pairs each having a transmitting antenna element and a first receiving antenna element. The novelty is further demonstrated by the structure of "...the first antenna element pair and the second antenna element pair are spaced from each other to create an area of reduced sensitivity between the first antenna element pair and the second antenna element pair."

Further, the Office Action alleges that claims 11 and 18, Carr et al. discloses antenna elements (col. 3, lines 30-52) and Hirschman disclose the application of RF electrical energy to such elements (col. 7, lines 49-55), but neither Carr et al. nor Hirschman specifically disclose that the space between the first element pair and the second element pair being set so that the sensor is insensitive to fluid changes of a predetermined volume within the area of reduces sensitivity. However, Culver et al. teaches detecting extravasation by checking if a prescribed threshold volume is crossed, at which an injection should be stopped (col. 13, lines 11-14). Therefore, it would be have obvious to one of ordinary skill in the art at the time of invention to apply the teaching of Culver et al. to Carr et al. and Hirschman, as to provide a measure of the sensor's sensitivity to detecting volume changes.

However, Culver does not teach or suggest Applicants' invention of the location

of the antenna pairs, namely, that "the space between the first antenna element pair and the second antenna pair is set so that the sensor is insensitive to fluid changes of a predetermined volume within the area of reduced sensitivities." As discussed above, Culver teaches that the distance between any of the light source and light sensors does not have any effect on the sensitivity of detecting extravasation. Thus, Culver teaches away from Applicants' invention. Accordingly, Claims 11 and 18 are believed to be allowable.

Claims 11-12 and 18-19 depend, either directly or indirectly, from Claims 1 and 13 respectively, which as discussed herein is believed to be allowable. Thus, Claims 11-12 and 18-19 are also believed to be allowable. Claims 9, 10, 16 and 17 have been canceled. Accordingly, reconsideration of Claims 1-8, 11-15 and 18-25 is respectfully requested.

In view of the above amendments and remarks, Applicants submit that the claims are in condition for allowance and the Examiner would be justified in allowing them.

Respectfully submitted,

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